

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Larry D. Seiler et al. Examiner Motilewa Good Johnson

Application No.: 10/777,842 Art Unit: 2628

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Title: APPEARANCE DETERMINATION USING FRAGMENT REDUCTION

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REMARKS FOR PRE-APPEAL BRIEF REQUEST FOR REVIEW

Dear Sir:

Applicants respectfully submit that the Examiner's rejections include clear errors because one or more claim limitations are not met by the cited publications and the publications do not teach what the Examiner alleges.

Claims 1-3, 5 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over US Patent Application Publication No. 2003/0030642 to Chen et al. ("Chen") in view of U.S. Patent No. 6,204,859 to Jouppi et al. ("Jouppi"). Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Jouppi and further in view of U.S. Patent Application Publication No. 2004/0169651 to Everitt et al. Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Jouppi and further in view of U.S. Patent No. 6,476,807 to Duluk, Jr. et al.

Jouppi teaches a method and apparatus for compositing colors of images in a graphics system in which images are defined by pixels and where the system's memory has constraints for storing pixel data. (Title, Abstract). For each given pixel, up to a predetermined number of fragment values, including the color of that fragment, are stored. (Abstract). "When a new fragment is visible in a given pixel, one of the fragment values is discarded to determine which

fragment values are stored and subsequently used to generate the color of the pixel. ... Various strategies can be used to determine which fragment value is discarded.” (Abstract, Emphasis added).

Jouppi’s FIG. 7 appears to describe a process of generating an image. After partitioning the image into fragments, “the graphics processor 108 determines whether the new fragment is visible at any of the subpixel samples S1-S4 covered by the new fragment.” (Col. 15, ll. 13-20). Jouppi teaches that the new fragment is invisible when the Z-depth value of the new fragment is larger than the Z-depth value of the store fragment associated with each covered subpixel sample S1-S4 (steps 702-704, Col. 15, ll. 20-28, 34-37) or when the alpha value of the new fragment is 0.0. (Col. 15, ll. 28-33). In the latter case, “the new fragment is completely transparent.” (Col. 15, ll. 30-31). When the fragment is invisible as either being either behind an opaque foreground fragment or as a result of having an alpha value of 0.0, “the processing of the new fragment is complete.” (Col. 15, ll. 39-41). In other words, the new fragment appears to be discarded when the new fragment is invisible. Only when the new fragment is visible (i.e., not invisible) does Jouppi consider whether the new fragment should be stored in pixel memory for consideration in determining the pixel color or whether the new fragment should be discarded as a result of one or more various strategies that determine that the new fragment and its value will not contribute to the pixel color. (Col. 15, l. 43 – Col. 16, l. 29; FIG. 7, Steps 710-720; Col. 6, ll. 56-63, etc.). Color is computed by sampling the fragment values associated with fragments that cover a subpixel. (Col. 6, ll. 35-45). In short, new fragment data appears to be discarded when it is invisible or when it is visible but one of the various strategies employed by Jouppi determines that it should not have an impact on the color of the pixel.

When a strategy requires a previously stored fragment to be discarded, the fragment appears to be “replaced” in memory by the new fragment. (Col. 16, ll. 6-9; FIG. 7, Step 716). “Replacement means changing the color, Z-depth, and stencil values stored in the selected fragment triple to the color, Z-depth, and stencil values of the new fragment triple.” (Col. 16, ll. 9-12). The effect of replacement is discarding the old fragment value. (Col. 9, ll. 31-36). When a strategy requires a new fragment is to be discarded, it presumably is not saved in the pixel memory for consideration in determining the color of the pixel. (Col. 7, ll. 53-58, Abstract, Col. 6, ll. 56-63). No other aspect of discarding appears to be taught by the cited portions of Jouppi.

In contrast, Applicants’ claim 1 requires an apparatus comprising, among other things, “a pixel appearance determination circuit, coupled to the rasterizer, operative to determine a pixel appearance value based on the fragment data by dropping the fragment data having the least effect on pixel data, wherein dropping the fragment data further includes assigning the fragment data to be dropped with a no color designation.” (Emphasis added). Applicants respectfully submit that Jouppi fails to teach or suggest the dropping of fragment data including assigning fragment data to be dropped with a no color designation as alleged by the Examiner. In other words, Jouppi does not teach what the Examiner alleges.

For instance, the Office action mailed December 29, 2006 alleges that “Jouppi further teaches dropping the fragment data with a no color designation (complete transparency) (Column 15, lines 28-33).” (Office action, p. 3, emphasis in original). The Advisory action similarly states that:

Applicant argues that dropping the fragment data with a no color designation, and the office action fails to address claim language. It is the interpretation of the Examiner that transparency meets the claim limitation of having no color designated. Applicant argues that a color designation is not taught because Jouppi discloses using an existing alpha value to determine whether a fragment is

invisible instead of assigning the fragment to be dropped. The cited portion of Jouppi discloses a new fragment with an alpha value of 0, and the new fragment is completely transparent, therefore no color is designated for the fragment. (Advisory action, Continuation Sheet).

Applicants submit that the portion of Jouppi cited by the Examiner overlaps with cited portions of Jouppi cited by Applicants in the aforementioned characterization. As noted, Jouppi does not appear to teach or suggest the dropping of fragment data including assigning of fragment data to be dropped with a no color designation. Instead, Jouppi uses a previously assigned alpha value in one embodiment to first determine if the fragment is visible. If the fragment is invisible, the fragment is not stored in pixel memory but is discarded before its fragment value may be considered for determining the pixel's color. If the fragment is visible, then other techniques are used to determine if the fragment should be used to compute a pixel color or discarded. In no event does Jouppi appear to teach or suggest the dropping of fragment data including assigning fragment data to be dropped with a no color designation. At best, the publication teaches the processing of a fragment that already has an alpha value of 0.0 (i.e., the fragment is transparent) by identifying that it is not visible because of its pre-assigned alpha value and presumably deleting or discarding it. In other words, Jouppi does not drop fragment data where the dropping of fragment data includes assigning fragment data to be dropped with a no color designation. The publication separately teaches that if the fragment is visible at least because of its pre-assigned alpha value, the fragment may be used to compute the pixel color or is discarded. Again, Jouppi fails to teach or suggest Applicants' claim language because the fragment was previously assigned the alpha value before the dropping of the fragment data. Accordingly, Jouppi cannot be said to teach or suggest the dropping of fragment data including assigning the fragment data to be dropped with a no color designation. Therefore, claim 1 is believed to be in proper condition for allowance.

Claims 2-5 and 7-8 depend upon allowable claim 1 and are further believed to add additional novel and non-obvious, patentable subject matter. For at least the reasons stated above, claims 2-5 and 7-8 are also believed to be allowable over the cited publications.

Claim 14 was added after the Office action mailed December 29, 2006. The Advisory action contradicts itself with respect to whether new claim 14 was entered. Specifically, box 7(a) of the Advisory action is checked indicating that the proposed amendments will not be entered. However, the status of the claims lists claim 14 as being rejected. Applicants respectfully submit that a claim cannot be rejected unless it is entered. Accordingly, Applicants interpret this inconsistency in Applicants' favor and assume that claim 14 was entered.

Claim 14 requires, among other things, "assigning the fragment data to be dropped with a no color designation comprising reducing a number of valid sub-sample locations in the pixel." (Emphasis added). Because claim 14 requires, among other things, the assignment of fragment data to be dropped with a no color designation as presented in claim 1, Applicants respectfully reassert the relevant remarks made above with respect to claim 1. For at least these reasons, claim 14 is also believed to be in proper condition for allowance.

Reconsideration, withdrawal of the rejection of the claims and a Notice of Allowance is respectfully requested.

Respectfully submitted,

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